



## REMR TECHNICAL NOTE CS-MR-1.5

CONCRETE REMOVAL TECHNIQUE: HAND-HELD  
BREAKER

The hand-held breaker as depicted above has been used at Corps projects to remove limited areas of distressed and deteriorated concrete

PURPOSE: To describe a hand-held breaker and its use for concrete removal.

APPLICATION: The hand-held breaker is an impact tool that employs a rapid succession of light blows and the wedging action of its breaking bit to fracture and spall concrete. The most common type of mechanical tool used for concrete removal, the hand-held breaker is normally used for projects requiring limited removal and to aid other removal methods when work involves removal of large volumes of concrete.

ADVANTAGES: The hand-held breaker is commercially available throughout the United States and requires little capital investment. It can be operated by unskilled labor and can be used in areas of limited work space.

LIMITATIONS: The hand-held breaker is applicable to projects involving limited removal and to aid other removal methods when work involves removal of large volumes of concrete. It is best suited for downward breaking action, requiring breakers in the 50- to 90-lb class. For a heavy breaker with amoil point

(type of breaker bit) on nonreinforced concrete, a breaking rate of approximately 25 cu ft/hr (Ref a) has been achieved. For reinforced areas, this rate will be considerably lower depending on the amount of reinforcement present. Lighter breakers are required when breaking action is in a direction other than downward. Both size of the breaker and working angle significantly influence productivity of the operation. The choice of tool point and the age and strength of the concrete also affect the productivity of the breaking operation. During the breaking, the operator must wear hearing protection due to the noise generated by the operation.

PERSONNEL REQUIREMENTS: Hand-held breakers can be operated by unskilled labor. However, the more experience and ability the operator has, the greater the productivity.

EQUIPMENT: A hand-held breaker such as the one shown in the photo consists of a backhead group, a cylinder group, and a fronthead group (Ref a). The backhead group contains a handle for holding the breaker, a power source or power connection, and operating controls. The cylinder group drives the breaker attachment and consists of a cylinder, piston, and valve assembly. The fronthead group provides a socket for holding the breaker bit or attachment. The breaker is operated from one of four power sources: a compressed-air system, a hydraulic system, a self-contained gasoline engine, or a self-contained electric motor.

The pneumatic breaker, operated by compressed air, is the most common type of hand-held breaker. In general, the pneumatic breaker requires less maintenance and is more rugged than the other types of breakers. No special care is required during transportation or storage. In extreme cold, it may be necessary to add antifreeze solution to the air line to prevent the exhaust port from being iced shut.

ENVIRONMENTAL CONSIDERATIONS: Large amounts of broken concrete removed from Corps projects might be placed in open water to serve as a fish attractor reef. Several references are available (Ref b, c, d, and e) that contain suggestions for locating, sizing, and marking fish attractors. Precautions should be taken to minimize noise generation when concrete removal techniques are performed in close proximity to groups of people.

- REFERENCES:
- a. Air compressor pneumatic tools and quarrying techniques. US Army Engineer School, Fort Belvoir, VA, 1967.
  - b. Western reservoir and stream habitat improvements handbook. R. W. Nelson, G. C. Horak, J. E. Nelson. US Department of the Interior, Fish and Wildlife Service, Ft. Collins, CO, 1978.
  - c. Concrete rubble and miscellaneous materials as artificial reef material. L. L. Ryder. In: Artificial reefs, proceedings of a conference held 13-15 September 1979, Daytona Beach, FL, D. Y. Aska, ed., University of Florida-Gainesville, Florida Sea Grant College, 1981, pp 89-91. Report No. 41.

- d. Mitigation and enhancement techniques for the Upper Mississippi River system and other large river systems. R. A. Schnick, et al. US Department of the Interior, Fish and Wildlife Service, Washington, DC, 1982. Resource Publication 149.
- e. Fish habitat improvement handbook. M. E. Seehorn. US Department of Agriculture, Forest Service, Southern Region, Atlanta, GA, 1985. Technical Publication R8-TP 7.